

REVIEW ARTICLE

Beyond the Golden Hour: Exploring the Role of Ayurveda in Post-Emergency Recovery and Rehabilitation

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Received: 04/10/2026

Revised: 13/10/2026

Accepted: 16/10/2026

Published: 22/10/2026

Abstract

Background: Recovery after stroke, cardiovascular events, major trauma and critical illness may continue after emergency stabilisation and require condition-specific rehabilitation. **Objective:** To critically discuss the potential supportive role of Ayurvedic concepts and interventions while distinguishing traditional rationale from clinical evidence. **Methods:** This focused narrative review discusses selected clinical guidance, published trial reports, review literature and classical Ayurvedic concepts relevant to post-emergency recovery. Evidence is discussed narratively across major clinical contexts; the article does not present itself as a systematic review or meta-analysis. **Results:** Recovery needs and evidence differ by condition. Multidisciplinary rehabilitation, appropriate nutrition and psychological support are established elements of care. In the RESTORE randomised trial, 140 people with ischaemic stroke were assigned to Ayurvedic rehabilitation therapy or physiotherapy (70 per group). The tested Ayurvedic protocol was not shown to be superior to physiotherapy. Evidence for yoga after stroke remains very uncertain, and general rehabilitation guidance does not establish the efficacy of Ayurvedic medicines or procedures. **Conclusion:** *Ahara*, *Vihara*, *Bala*, *Pathya-Apathya* and *Rasayana* can provide a traditional framework for discussing supportive recovery, but do not themselves establish treatment efficacy. Ayurveda should not replace emergency treatment or standard rehabilitation. Any adjunct should be condition-specific, discussed with the treating team and evaluated for safety and intervention-specific evidence.

Keywords: Ayurveda, clinical evidence, integrative medicine, post-emergency recovery, *Rasayana*.

Introduction

Rehabilitation is a health system priority and WHO guidance addresses its planning and integration into health services.¹⁻³ Emergency care aims to prevent death, limit tissue injury and stabilise the patient. However, survival does not necessarily mark the end of treatment. Stroke, acute coronary syndromes, major trauma and critical illness may be followed by weakness, reduced independence, fatigue, pain, swallowing or nutritional difficulties, cognitive changes and psychological distress. Recovery therefore requires planning across hospital, rehabilitation and community settings rather than treating discharge as the final endpoint. Ayurveda offers a traditional framework that includes *Ahara* (diet), *Vihara* (lifestyle and activity), *Bala* (strength or capacity), *Pathya-Apathya* (contextually suitable and unsuitable practices) and *Rasayana* (a broad classical category associated with health maintenance and vitality). These concepts may help structure culturally responsive discussions of supportive care. Yet conceptual overlap with modern rehabilitation goals is not evidence that a particular Ayurvedic intervention improves clinical outcomes. This review therefore considers the evidence by condition and intervention, with attention to safety and uncertainty.

Review Methodology

This article presents a focused narrative review of selected clinical guidance, published trial reports, review literature and classical Ayurvedic sources relevant to post-emergency recovery and rehabilitation. The discussion is organised around major clinical contexts, including stroke, cardiovascular events, major trauma and surgery and recovery after critical illness. Clinical evidence is considered alongside traditional Ayurvedic concepts to distinguish established rehabilitation practices from interventions requiring further investigation. The review is narrative in nature and does not include a meta-analysis.

Clinical trials, systematic reviews and clinical guidelines are used to frame clinical claims, while classical Ayurvedic sources are included for traditional conceptual context. The selected literature is discussed qualitatively rather than combined statistically. Claims about clinical effectiveness are interpreted in light of the type and strength of available evidence and traditional concepts are not treated as proof of clinical efficacy.

As a narrative review, this article provides a qualitative discussion of selected sources rather than a comprehensive or systematic evidence synthesis. The sources address different clinical populations, interventions and outcomes and no pooled effect estimate is presented. Accordingly, conclusions are limited to the specific evidence discussed, and further condition-specific research is needed.

Recovery Needs After Major Emergencies

1. Stroke: Acute stroke diagnosis and initial management should follow the relevant clinical pathway.⁴ Stroke rehabilitation should be delivered by a specialist multidisciplinary service and tailored to the person's impairments and goals. It may include physiotherapy, occupational therapy, speech and language therapy, swallowing assessment, management of fatigue and mood, and support for activities of daily living. NICE recommends needs-based multidisciplinary rehabilitation and ongoing review of the person's functional and psychological needs.⁵

Among the studies discussed, the RESTORE trial provides the most directly relevant evidence identified for Ayurvedic rehabilitation after stroke. This pragmatic, multicentre, parallel-group randomised trial enrolled 140 people with ischaemic stroke across four comprehensive stroke centres in India, assigning 70 to Ayurvedic rehabilitation therapy (ART) and 70 to physiotherapy (PT). The primary outcome was upper-limb sensorimotor recovery measured by the Fugl-Meyer Assessment–Upper Extremity at three months;

secondary outcomes included functional disability, activities of daily living, balance and quality of life at one and three months. At three months, the unadjusted Fugl-Meyer score favoured PT; after adjustment for baseline factors, the between-group difference was not statistically significant. No secondary outcome was significantly better in the Ayurveda arm, and no major serious adverse events were reported during the study. The authors concluded that the tested ART protocol was not superior to PT.^{6–8}

The result must not be misrepresented as proof of equivalence, nor should it be generalised to every Ayurvedic practice. It does, however, argue against claims that the specific ART protocol is superior to standard physiotherapy. Yoga has also been studied as a possible adjunct after stroke, but a Cochrane review found very low certainty evidence from a small number of trials and concluded that available data were insufficient to confirm or refute effectiveness or safety.⁹ Any movement practice should be adapted to balance, cognition, strength, swallowing status and cardiovascular stability and should not displace specialist rehabilitation.

2. Cardiovascular recovery: After myocardial infarction or another acute cardiovascular event, rehabilitation generally includes individually prescribed physical activity, risk-factor management, education, medication adherence and psychosocial support. European Society of Cardiology guidance places secondary prevention and rehabilitation within ongoing cardiovascular care.¹⁰ Cardiac rehabilitation has also been associated with improvements in quality of life in coronary heart disease, although studies have used varied measures and approaches.¹¹ Food preferences, sleep and stress-management practices may be discussed as supportive lifestyle matters, but should be integrated with cardiology led advice rather than used as substitutes for prescribed medicines, cardiac rehabilitation or follow-up.¹⁰ New exercise, *Yoga*, massage, heat-based procedures or herbal products may be inappropriate during unstable symptoms, decompensated heart failure, uncontrolled arrhythmia, recent procedures or other complications. Activity intensity should be decided by the treating team. General lifestyle evidence should not be interpreted as evidence that a named Ayurvedic formulation or procedure improves post-cardiac outcomes.

3. Major trauma and surgery: Recovery after trauma is highly heterogeneous: a patient with an uncomplicated soft-tissue injury has different needs from a person with polytrauma, a fracture, traumatic brain injury or major

surgery. Priorities may include wound care, fracture stabilisation, pain management, mobility, prevention of complications, psychological support and graded return to daily activities. Any complementary approach must respect surgical instructions, weight-bearing restrictions, anticoagulant use and infection risk. Massage, heat, oils, vigorous manipulation or herbal products should not be presumed safe near fractures, wounds or healing tissues. Evidence for general rehabilitation does not establish efficacy for a specific Ayurvedic intervention after trauma.

4. Recovery after critical illness: People who survive critical illness may develop post-intensive-care syndrome, involving physical, cognitive and/or psychological impairment. A multidisciplinary guideline recommends repeated assessment and an individualised approach; recommendations include early mobilisation when clinically appropriate, motor training, nutrition and dysphagia management, and attention to psychological and cognitive health.¹² The ESPEN intensive-care nutrition guideline provides further clinical guidance for nutrition during critical illness.¹³ These sources support standard rehabilitation and nutrition practice, not Ayurvedic treatment efficacy specifically.¹²⁻¹⁴ In patients with swallowing difficulty, oral food or drink should not be encouraged before appropriate assessment. Nutrition plans may need to account for kidney or liver dysfunction, diabetes, fluid restriction, pressure injuries and changing energy or protein needs. Ayurvedic dietary concepts may be discussed alongside this assessment, but cannot replace clinical nutrition care.

Ayurvedic Concepts Relevant to Supportive Recovery

1. Ahara and Pathya-Apathya:

Ahara places food and dietary practice within Ayurvedic health discourse. *Pathya-Apathya* concerns the suitability of foods or practices in a particular context. These ideas may encourage individualisation, attention to tolerance and culturally familiar food choices. In clinical recovery, however, diet must also meet assessed energy and protein needs and account for swallowing safety, fluid limits, renal or cardiac restrictions, diabetes and medication related considerations. Classical concepts should be cited to an identified text and edition when a specific textual claim is made; they should not be presented as validated clinical outcomes.

2. Vihara and mind-body practices:

Vihara broadly concerns lifestyle, activity and daily routines. Rest, sleep, graded activity and psychosocial support are relevant to many recovery pathways, but their clinical prescription depends on the condition. *Yoga* and breathing practices are not interchangeable with all Ayurvedic therapies, and evidence for one practice cannot establish efficacy for herbal formulations or Panchakarma. For medically stable patients, selected gentle practices may be considered if the treating team agrees and the activity is adapted to physical limitations.

3. Bala and Rasayana in supported recovery: In Ayurveda, *Bala* refers broadly to strength, capacity and resilience, encompassing the individual's ability to sustain physical and functional activities. In the context of post-emergency recovery, assessment of *Bala* may provide a traditional perspective on the patient's overall condition, tolerance to activity and capacity for gradual rehabilitation. However, *Bala* should not be interpreted as directly equivalent to objectively measured muscle strength, functional independence or other validated rehabilitation outcomes.

Rasayana represents a broad category of Ayurvedic approaches traditionally associated with the maintenance of health, nourishment and vitality. Its conceptual relevance to recovery lies in the emphasis on restoring and maintaining general well-being. Nevertheless, *Rasayana* encompasses diverse interventions, and their clinical effects cannot be assumed to be uniform. Claims regarding improved neurological function, immunity, tissue repair or accelerated rehabilitation require evidence from appropriately designed clinical studies evaluating the specific intervention.

The concept of restoring health after illness may also be discussed within an Ayurvedic framework; however, the term *Punarvasthanapana* should not be presented as an established classical technical category without an identifiable textual source. In contemporary integrative rehabilitation, these traditional concepts may inform individualised supportive-care discussions, provided they remain distinct from evidence-based clinical recommendations. Future investigations should clearly describe intervention composition, dosage, duration, safety considerations and measurable rehabilitation outcomes.^{15,16}

Comparative Evidence and Practical Implications

The evidence is not uniform across diagnoses. Direct evidence for Ayurveda in post-emergency rehabilitation

is limited, and studies of conventional rehabilitation, nutrition or yoga answer different questions. Table 1 distinguishes the evidence area from what it can and cannot establish.

Safety and Condition-Specific Cautions

Safety assessment is essential because patients recovering from emergencies may take antiplatelet agents, anticoagulants, antihypertensives, glucose-lowering drugs, analgesics and other medicines. Herbal products differ in ingredients, dose, manufacturing quality and contamination risk; potential interactions must be assessed for the specific product rather than

assumed absent. Clinicians should be told about all herbal products and procedures being used. Manual procedures, heat, massage and strenuous movement may be unsuitable with recent surgery, fractures, wounds, impaired sensation, bleeding risk, unstable cardiovascular status or significant neurological deficits. Patients with dysphagia require appropriate swallowing assessment before oral intake. No complementary treatment should delay emergency assessment, alter prescribed treatment without the prescriber's involvement, or replace evidence-based rehabilitation. Where safety data are absent, the appropriate conclusion is uncertainty - not assumed safety.

Evidence area / study	Population and intervention	Outcomes or findings	Main limitations	Clinical implication
RESTORE RCT ⁶	140 adults with ischaemic stroke; ART (n=70) versus physiotherapy (n=70).	Primary FMA-UE outcome at 3 months; functional disability, ADLs, balance and quality of life assessed at 1 and 3 months. ART was not shown superior to PT.	One defined ART protocol and trial population; adjusted primary comparison was not statistically significant; not evidence of equivalence or all Ayurvedic therapies.	Standard stroke rehabilitation remains the foundation; do not claim ART superiority.
Yoga after stroke: Cochrane review ⁹	Two small trials of yoga as an adjunct in stroke rehabilitation.	Evidence was very low certainty; insufficient to confirm or refute benefit or safety.	Small evidence base, high risk of bias and imprecision.	Only consider adapted practice for selected stable patients; do not replace rehabilitation.
Stroke rehabilitation guideline ⁵	Adults requiring rehabilitation after stroke.	Multidisciplinary, needs-based rehabilitation with goal-oriented assessment and therapy.	Guidance is for standard stroke care, not Ayurveda-specific treatment.	Use specialist rehabilitation and tailor care to patient goals.
Post-intensive-care syndrome guideline ¹²	Adults at risk of or experiencing physical, cognitive or psychological sequelae after critical illness.	Supports repeated assessment, mobilisation/motor training, nutrition/swallowing management and psychological/cognitive care.	Interventions and patient needs are heterogeneous; recommendations do not test Ayurveda.	Use multidisciplinary follow-up; assess swallowing and nutrition before prescribing oral intake.
ICU nutrition guideline ¹³	Critically ill adults requiring nutrition support.	Provides clinical guidance for nutrition management in ICU settings.	Not a trial of Ayurveda or post-discharge Ayurvedic recovery.	Nutrition should be clinically assessed and adjusted to organ function and disease status.
Cardiovascular rehabilitation guidance ¹⁰	Patients after acute coronary syndromes and related cardiovascular conditions.	Supports guideline-based cardiovascular management and secondary prevention.	Does not establish efficacy of Ayurvedic therapies.	Coordinate activity, diet and any complementary intervention with the cardiology team.
Ayurvedic concepts: <i>Ahara</i> , <i>Vihara</i> , <i>Bala</i> , <i>Rasayana</i>	Classical conceptual frameworks, not a single clinical intervention.	Can organise traditional discussion of diet, routine, capacity and health maintenance.	Textual concepts do not establish clinical effect; formulations and practices vary.	Describe concepts accurately and separate traditional rationale from tested outcomes.

Table 1: Comparative evidence and practical implications for post-emergency rehabilitation

Discussion

The post-emergency period is clinically important because impairments may persist after acute

stabilisation, and rehabilitation needs can extend across hospital and community settings. Ayurveda offers a culturally familiar vocabulary for discussing food, daily

routine, strength and health maintenance. This may be useful in shared decision-making when the concepts are applied carefully. Nevertheless, cultural relevance and theoretical plausibility are not substitutes for evidence of effectiveness.

RESTORE is a key trial because it directly compared a defined Ayurvedic rehabilitation protocol with physiotherapy after ischaemic stroke. Its findings do not support a claim that the tested ART protocol is superior to PT. The trial does not settle every question about every Ayurvedic intervention, but the absence of a superiority finding should be stated plainly. Likewise, conventional rehabilitation guidelines support the importance of multidisciplinary care; they should not be cited as evidence for Ayurveda. A practical framework is to classify proposals into three groups. First, supportive practices that are generally compatible with recovery goals- such as culturally appropriate food planning, sleep routines and clinician-approved graded activity, may be considered as part of usual care, subject to individual assessment. Second, interventions with insufficient direct evidence, including many named Ayurvedic formulations, procedures and broad *Rasayana* claims should be described as unproven for the specific indication and, if pursued, discussed with the clinical team. Third, cautionary or unsuitable approaches include anything that delays emergency treatment, replaces prescribed medication or rehabilitation, conflicts with surgical or weight-bearing restrictions, or is used without assessing interactions and patient stability. The evidence base is constrained by variation in diagnosis, intervention, comparator, dose, outcome measures and follow-up. A treatment category as broad as Ayurveda cannot be evaluated as though it were one standardised intervention. Future research should test defined treatments in defined populations, with transparent product descriptions, appropriate comparators and patient-important outcomes.

Research Priorities

- Conduct adequately powered studies in distinct populations rather than combining stroke, cardiac events, trauma and post-ICU recovery into a single group.
- Describe the intervention in reproducible detail: ingredients, formulation, quality assurance, dose, route, duration, practitioner training and co-interventions.
- Use appropriate control groups and prespecified analyses; report effect estimates and confidence intervals, not only statistical significance.

- Measure functional independence, quality of life, fatigue, pain, nutrition, return to daily activities and other outcomes relevant to patients.
- Record adverse events, withdrawals, adherence and potential herb-drug interactions systematically, with adequate follow-up.
- Use authentic classical references for textual claims, while keeping classical interpretation separate from clinical efficacy claims.

Limitations

This narrative review has limitations. The available evidence varies across clinical conditions and interventions, and findings from general rehabilitation studies cannot be directly interpreted as evidence for specific Ayurvedic treatments. The narrative approach does not provide a quantitative synthesis of outcomes. Further condition-specific research using clearly defined interventions, appropriate comparators and clinically meaningful outcomes is needed.

Conclusion

Recovery after emergency stabilisation may require prolonged physical, nutritional, cognitive and psychological support. Ayurvedic concepts such as *Ahara*, *Vihara*, *Bala* and *Rasayana* can frame discussion of supportive care, but their clinical value in specific post-emergency settings requires direct evaluation. In the RESTORE trial, the tested Ayurvedic rehabilitation protocol was not shown to be superior to conventional physiotherapy for sensorimotor recovery after ischaemic stroke. Ayurveda should not replace emergency treatment or established rehabilitation. Any adjunct should be condition-specific, medically supervised and assessed for safety. Well-designed trials are needed to identify whether defined Ayurvedic interventions improve meaningful outcomes.

Funding

No external funding was received for this work.

Conflict of Interest

The author declares no conflict of interest.

Data Availability

Not applicable. This narrative review did not generate a primary dataset.

Author Contributions

The author conceptualised the review, prepared the manuscript and approved the final version. The author

takes responsibility for the accuracy, originality, integrity and scientific content of the final manuscript.

AI Usage Disclosure

ChatGPT (OpenAI) was used to assist with language editing, organisation of sections and drafting support during manuscript revision. The author is responsible for checking the accuracy of references, citations, interpretations and claims; confirming that the manuscript is original and complies with the journal's policies and approving the final submitted version.

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How to cite this article: Baishya K. *Beyond the golden hour: exploring the role of Ayurveda in post-emergency recovery and rehabilitation. Journal of Advanced Ayurveda Research & Innovation*. 2026;1(1):21-26.